PCT/GB 2003 / 0 0 5 7 2 2

INVESTOR IN PEOPLE

The Patent Office
Concept House
Cardiff Road
Newport
South Wales
NP10 8QQ

PRIORITY DOCUMENT

SUBMITTED OR TRANSMITTED IN COMPLIANCE WITH RULE 17.1(a) OR (b)

I, the undersigned, being an officer duly authorised in accordance with Section 74(1) and (4) of the Deregulation & Contracting Out Act 1994, to sign and issue certificates on behalf of the Comptroller-General, hereby certify that annexed hereto is a true copy of the documents as originally filed in connection with the patent application identified therein.

In accordance with the Patents (Companies Re-registration) Rules 1982, if a company named in this certificate and any accompanying documents has re-registered under the Companies Act 1980 with the same name as that with which it was registered immediately before re-registration save for the substitution as, or inclusion as, the last part of the name of the words "public limited company" or their equivalents in Welsh, references to the name of the company in this certificate and any accompanying documents shall be treated as references to the name with which it is so re-registered.

In accordance with the rules, the words "public limited company" may be replaced by p.l.c., plc, P.L.C. or PLC.

Re[illegible]istration under the Companies Act does not constitute a new legal entity but merely sub[illegible]s the company to certain additional company law rules.

Signed

Dated 2 February 2004

Patents Form 1/77

Patents Act 1977
(Rule 16)

09JAN03 E775828-1 D10002
P01/7700 0.00-0300472.8

Request for grant of a patent

(See the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form)

The Patent Office

Cardiff Road
Newport
South Wales
NP10 8QQ

1. Your reference

ids.2700.uk.jae

2. Patent application number
(The Patent Office will fill in this part)

0300472.8

09 JAN 2003

3. Full name, address and postcode of the or of each applicant *(underline all surnames)*

Infinite Data Storage Ltd
1 Pitreavie Court
DUNFERMLINE
KY11 8UG

Patents ADP number *(if you know it)*

8465486001

If the applicant is a corporate body, give the country/state of its incorporation

United Kingdom

4. Title of the invention

Single piece optical mechanical assembly for optical data storage engines

5. Name of your agent *(if you have one)*

Kennedys Patent Agency Limited

"Address for service" in the United Kingdom to which all correspondence should be sent *(including the postcode)*

Floor 5, Queens House
29 St Vincent Place
GLASGOW
G1 2DT

Patents ADP number *(if you know it)*

8058240002

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and *(if you know it)* the or each application number

Country	Priority application number *(if you know it)*	Date of filing *(day / month / year)*
–		

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application	Date of filing *(day / month / year)*
–	

8. Is a statement of inventorship and of right to grant of a patent required in support of this request? *(Answer 'Yes' if:*

a) any applicant named in part 3 is not an inventor, or
b) there is an inventor who is not named as an applicant, or
c) any named applicant is a corporate body.
See note (d))

YES

Patents Form 1/77

9. Enter the number of sheets for any of the following items you are filing with this form. Do not count copies of the same document

Continuation sheets of this form	–
Description	7
Claim(s)	–
Abstract	–
Drawing(s)	2 only FM

10. If you are also filing any of the following, state how many against each item.

Priority documents	–
Translations of priority documents	–
Statement of inventorship and right to grant of a patent *(Patents Form 7/77)*	–
Request for preliminary examination and search *(Patents Form 9/77)*	–
Request for substantive examination *(Patents Form 10/77)*	–
Any other documents *(please specify)*	–

11. I/We request the grant of a patent on the basis of this application.

Signature Kennedys Date 9/01/03

12. Name and daytime telephone number of person to contact in the United Kingdom: Jim Adams Tel: 0141 226 6826

Warning

After an application for a patent has been filed, the Comptroller of the Patent Office will consider whether publication or communication of the invention should be prohibited or restricted under Section 22 of the Patents Act 1977. You will be informed if it is necessary to prohibit or restrict your invention in this way. Furthermore, if you live in the United Kingdom, Section 23 of the Patents Act 1977 stops you from applying for a patent abroad without first getting written permission from the Patent Office unless an application has been filed at least 6 weeks beforehand in the United Kingdom for a patent for the same invention and either no direction prohibiting publication or communication has been given, or any such direction has been revoked.

Notes

a) *If you need help to fill in this form or you have any questions, please contact the Patent Office on 08459 500505.*

b) *Write your answers in capital letters using black ink or you may type them.*

c) *If there is not enough space for all the relevant details on any part of this form, please continue on a separate sheet of paper and write "see continuation sheet" in the relevant part(s). Any continuation sheet should be attached to this form.*

d) *If you have answered 'Yes' Patents Form 7/77 will need to be filed.*

e) *Once you have filled in the form you must remember to sign and date it.*

f) *For details of the fee and ways to pay please contact the Patent Office.*

Single piece Optical Mechanical Assembly for optical data storage engines

The present invention relates to recordable / re-writable optical storage technology, especially portable CD and DVD drives. In particular, the invention relates to mechanical improvements to the drive design, which can reduce cost, improve tolerancing and build time.

The basis for nearly all optical data storage systems to date has been the Compact Disc format proposed by Philips and Sony, some 20 years ago. This standard has been modified from the original audio storage, to include data of all formats, and also Recordable / re-writable versions. The CD has become a familiar standard, and the flexibility has lead to an increasing variety of uses. The creation of DVD over the last few years has expanded the capacity of optical data storage available to the consumer, whilst maintaining a familiar look and feel. In particular, growth has been seen in portable solutions, and these portable solutions have specific requirements separate from the needs of a PC based solution. The needs of a portable solution include small size, and improved

power consumption. Additionally portable optical data storage solutions can often be directed more towards the consumer electronic environment, which has very tight cost restrictions.

An optical data storage device consists of a number of sections which can be divided into mechanical, electronic and firmware. Historically Optical Mechanical Assemblies (OMA) for use in CD, CDRW, DVD and recordable DVD drives require a chassis which has location features to mount the guide rail and the leadscrew (for location of the Optical Pick Up (OPU) reading / recording head), the sled motor which traverses the OPU across the data area of the disc and the spindle motor for spinning the disc. The spindle motor typically is purchased from a specialised motor supplier who would supply the motor with a mounting plate for attachment to the chassis via screws. Typically in portable optical data storage systems, a scaled down version of the OMA used in non-portable applications, such as PC CD drives etc, is created. Designs are known that have enabled the integration of the OMA unit within the drive body thus reducing some component count and tolerancing. However, the integrated OMA still required a separate motor assembly and sled drive system, and was suitable for a complete product design only, rather than an "engine" solution for use in a wide variety of products.

It would be advantageous to reduce the overall size of the OMA and reduce the part count and hence cost.

It would be further advantageous to improve the tolerancing of the OMA, in particular the location of the

leadscrew and guide rail, which improve tilt performance. The improved tilt performance can reduce manufacturing time and risk.

It would be further advantageous to increase the rigidity and stability of the OMA, and in particular its response to high speed operation.

It is an object of the present invention to provide an improved chassis for the Optical Mechanical Assembly for an optical data storage device.

According to a first aspect of the present invention there is provided a single piece chassis for use in portable optical data storage applications.

According to a second aspect of the present invention there is provided an Optical Mechanical Assembly (OMA) for use in portable optical data storage applications, comprising a single piece chassis.

Preferably said chassis is the mounting plate for the motor shaft of the disc spindle motor.

Preferably said chassis is the mounting plate for the windings of the disc spindle motor.

Preferably said chassis is the mounting plate for the control circuit of the disc spindle motor.

Preferably the chassis comprises metal.

Preferably said chassis is the mounting plate for the sled motor.

Preferably said chassis is the mounting plate for the drive system.

Preferably said chassis is the mounting plate for the leadscrew.

Preferably said chassis is the mounting plate for a first guide rail.

Preferably the sled motor motion is driven onto the leadscrew via a gearbox assembly.

Alternatively the sled motor motion is driven directly from a stepper motor onto the leadscrew.

Preferably a second guide rail is mounted on the chassis and the sled drive from the leadscrew acts on the OPU via this second guide rail using a cam. This reduces vibrational susceptibility.

Preferably screws are used to allow for OPU tilt adjustment. Preferably the screws are mounted on both ends of the first guide rail, and one end of the leadscrew.

Preferably there are three screws.

Optionally the screws are mounted on both ends of the leadscrew and one end of the first guide rail.

Preferably the screws are mounted on both ends of one of the first or second guide rails, and one end of the other to allow for OPU tilt adjustment.

Preferably the screws are spring mounted.

In order to provide a better understanding of the present invention, an embodiment will now be described by way of example only and with reference to the accompanying Figures, in which:

Figure 1 illustrates, in schematic form an optical mechanical assembly, in accordance with a preferred embodiment of the present invention; and

Figure 2 illustrates, in schematic form a conventional optical mechanical assembly.

The present invention is an OMA chassis that is manufactured from a single piece of material. This chassis replaces the spindle motor base plate, and preferably the mounting for the sled motor, and may contain locators for the leadscrew and guide rail.

With reference to Figure 1, the OMA 10 incorporates the metal mounting plate 14 of the motor 12 into the metal chassis plate 14 of the OMA. The metal part of the chassis is thus manufactured with an additional area where the motor is sited. The chassis plate then has the motor shaft, windings and control circuit mounted to it directly thus combining the motor plate and the chassis. Rigid materials other than metal may be used.

The chassis also acts as the mounting plate for the sled motor 16 and drive system and as the mounting for the leadscrew 18 that moves the drive cam 20.

The chassis also acts as the mounting plate for the guide rail 22 required for the Optical PickUp (OPU) 24.

The OPU sled motor motion may be driven onto the leadscrew via a gearbox assembly.

The sled motor motion may be driven directly from a stepper motor onto the leadscrew.

An additional guide rail 26 is mounted and the sled drive from the lead screw acts on the OPU via this additional guide rail using the cam, thus reducing vibrational susceptibility.

Three spring mounted screws are used to allow for OPU tilt adjustment. The three screws may be mounted on either end of the guide rail, and one end of the leadscrew. Alternatively the three screws may be mounted either end of the leadscrew and one end of the guide rail. The three spring mounted screws are used to allow for OPU tilt adjustment. The three screws may be mounted on either end of one of the guide rails, and one end of the other.

Flex connectors 28 are also shown.

With reference to Figure 2, that shows a conventional OMA 30 for use in CD, CDRW, DVD and recordable DVD drives, the OMA incorporates a chassis 32 which has location

features to mount the guide rail 34, the leadscrew 36 for location of the Optical Pick Up (OPU) 38 reading / recording head, the sled motor 40 and gear train 42 which traverses the OPU across the data area of the disc and the spindle motor 44 for spinning the disc. The leadscrew provides drive to the OPU, and the motion is transferred via the use of a cam 46. The spindle motor comprises a mounting plate 48 for attachment to the chassis using screws. Flex connectors 50 are also shown.

The advantages of the present invention are a reduction in the overall size of the OMA, as well as a subsequent reduction in the part count and hence overall cost. The present invention also has the effect of improving the tolerancing of the OMA and in particular the location of the lead screw and guide rail (or both guide rails, if two are used), which has the effect of improving tilt performance. The improved tilt performance is critical to the success of optical engine solutions, and in particular recording solutions. Improvement in tilt will result in reduced manufacturing time for the OMA and also reduce the risk in the design stage. A further advantage of using the present invention is the increase in stability and rigidity of the OMA due to the single piece construction and cross support between the guide rail and leadscrew. The increase in rigidity and stability will improve the OMA performance, particularly at high speed operation.

Further modifications and improvements may be added without departing from the scope of the invention herein described.

1/2

INFORMAL

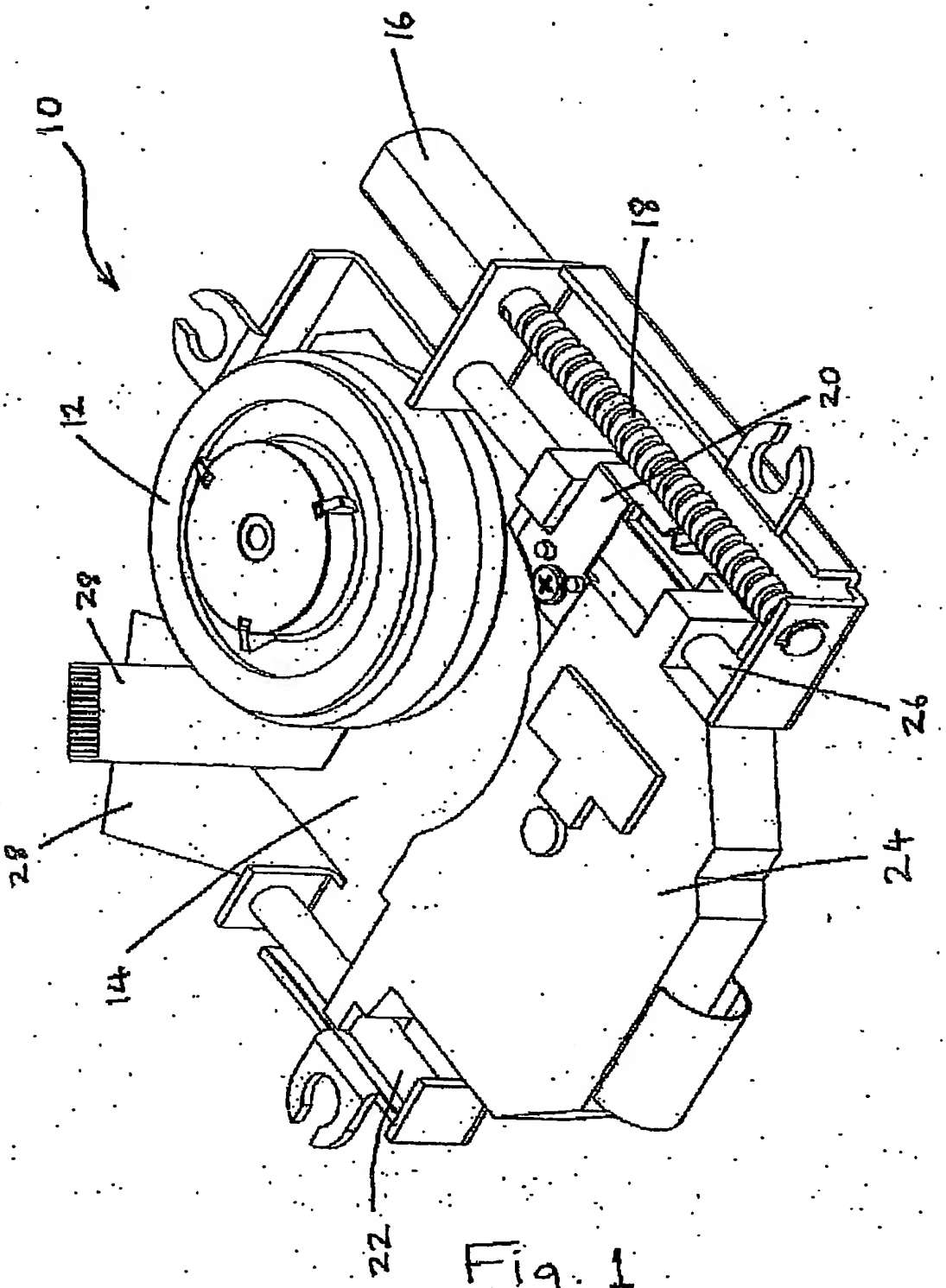

Fig. 1

INFORMAL

2/2

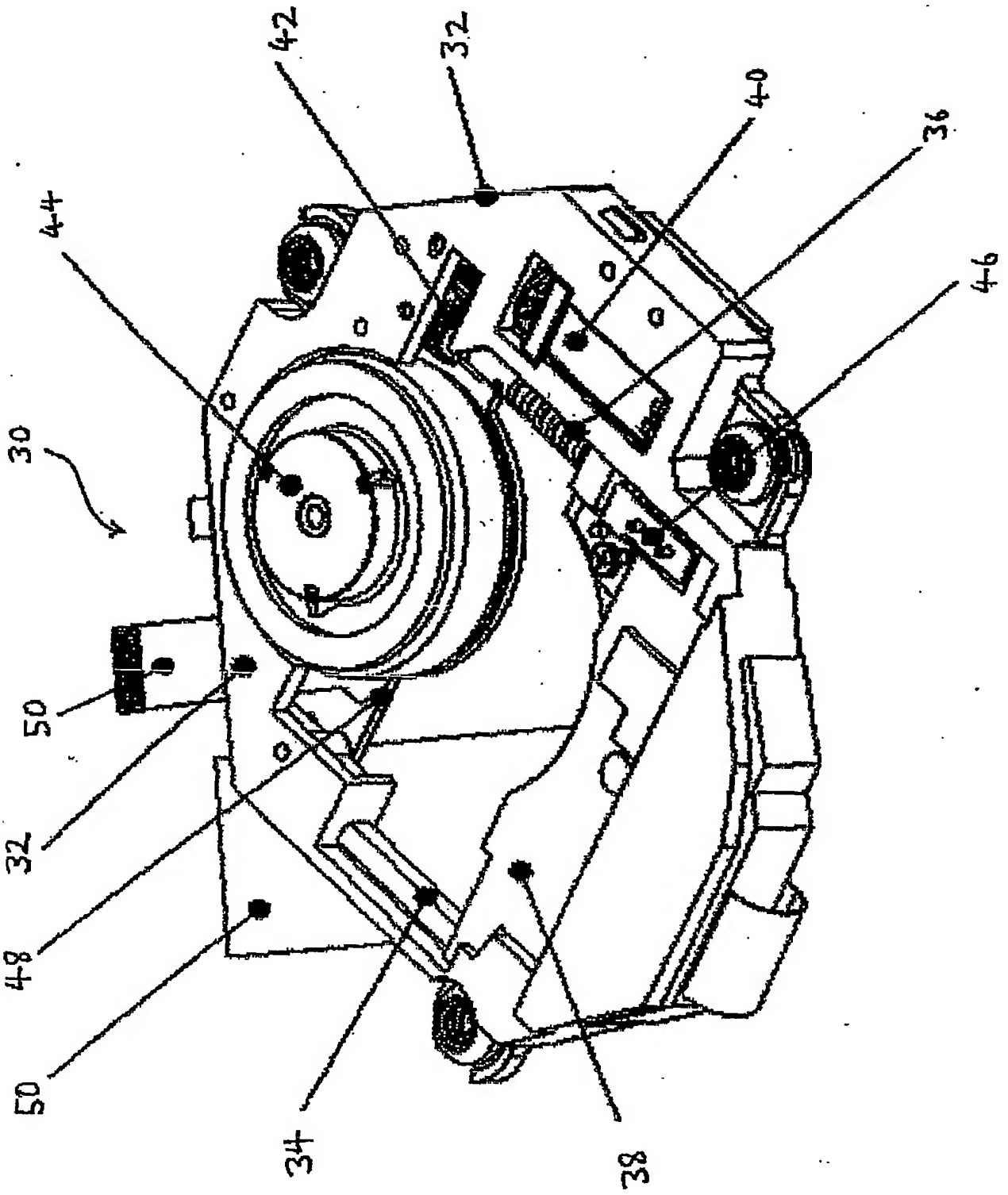

Fig. 2

This Page is inserted by IFW Indexing and Scanning Operations and is not part of the Official Record

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ BLACK BORDERS
- ☐ IMAGE CUT OFF AT TOP, BOTTOM OR SIDES
- ☐ FADED TEXT OR DRAWING
- ☒ BLURED OR ILLEGIBLE TEXT OR DRAWING
- ☐ SKEWED/SLANTED IMAGES
- ☐ COLORED OR BLACK AND WHITE PHOTOGRAPHS
- ☐ GRAY SCALE DOCUMENTS
- ☐ LINES OR MARKS ON ORIGINAL DOCUMENT
- ☐ REPERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY
- ☐ OTHER: _____

IMAGES ARE BEST AVAILABLE COPY.
As rescanning documents *will not* correct images problems checked, please do not report the problems to the IFW Image Problem Mailbox